

# *Prunus occidentalis* Sw.

# Almendrón

Rosaceae

Rose family

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*Prunus occidentalis* Sw. is known as almendrón in Puerto Rico because the flowers, leaves, and seeds have an almond-like fragrance. Almendrón is also known as pruan, prune tree (Jamaica), almendro, membrillo (Dominican Republic), amandier, á grandes feuilles (Haiti), cuajani, cuajani macho, almendro, almendro macho (Cuba), and noyeau (Guadeloupe and Martinique) (1, 5, 22, 25). Almendrón is a large evergreen tree (fig. 1) that grows to 24 m in height and 66 cm in d.b.h. It also forms large buttresses. Almendrón is a timber species with a rich, dark, reddish-brown heartwood that is very hard and durable. Its fruits are eaten by wildlife.

## HABITAT

### Native Range

Almendrón is a neotropical (fig. 2) species of the humid mountains of the West Indies; Mexico; Guatemala and Panama in Central America; and Venezuela in South America (1, 2, 6, 7, 10, 12, 19, 21, 22, 25, 27, 36). Although widespread regionally, the species is not common today in its natural habitat.

### Climate

In Puerto Rico, almendrón trees inhabit both the subtropical moist and wet forest life zones (13, 18). Mean annual rainfall ranges from 1100 to 2200 mm in the subtropical moist forest life zone and from 2000 to 4000 mm in the subtropical wet forest life zone. A dry season usually lasts about 3 months, beginning in January and ending in March or mid-April. Abrupt temperature changes in these two life zones are rare, and mean monthly temperatures vary little between the warmest and coldest months. Generally, mean annual temperatures range from 21.1 to 24.4 °C, with mean minimum temperatures of 15.2 to 19.4 °C and mean maximum temperatures of 23.7 to 31.8 °C (8). In the Dominican Republic, almendrón has been described as a component of the mesophytic forest that has a mean annual precipitation of 1125 to 1250 mm and two rainy periods—one from March to May and the other from July to November. Minimum precipitation occurs from February to March. Mean daily temperatures range from 15 to 20 °C, with minimum temperatures of 12 to 13 °C and maximum temperatures of 32 °C (9).

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In Cuba, almendrón has been found in moist habitats throughout the island where mean annual precipitation ranges from 1100 to 3125 mm. There is usually a 3-month dry period, beginning in January and ending in March, and two wet seasons, with the lower precipitation period from May to June and the higher precipitation period from September to October. Mean average daily temperatures vary from 15.5 to 26.6 °C (32).

In Jamaica, almendrón has been reported at a 450-m elevation in the Hog House Hill area of the John Crow Mountains. This area is in the path of constant northeast trade winds. Consequently, it receives high amounts of precipitation throughout the year, with no significant dry season. Mean annual rainfall ranges from 2814 to 3780 mm (24).

## Soils and Topography

Almendrón grows naturally in Puerto Rico in the valleys,

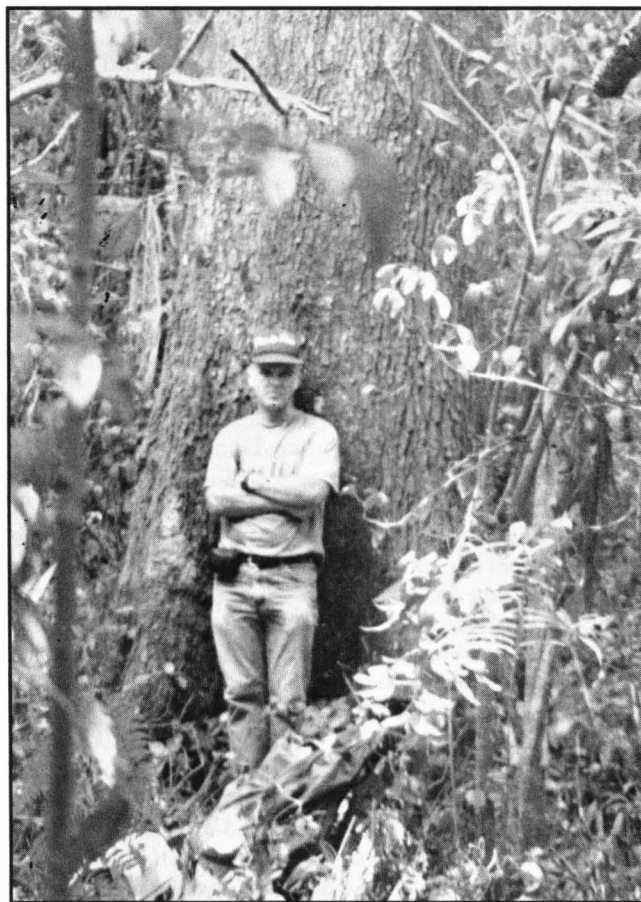
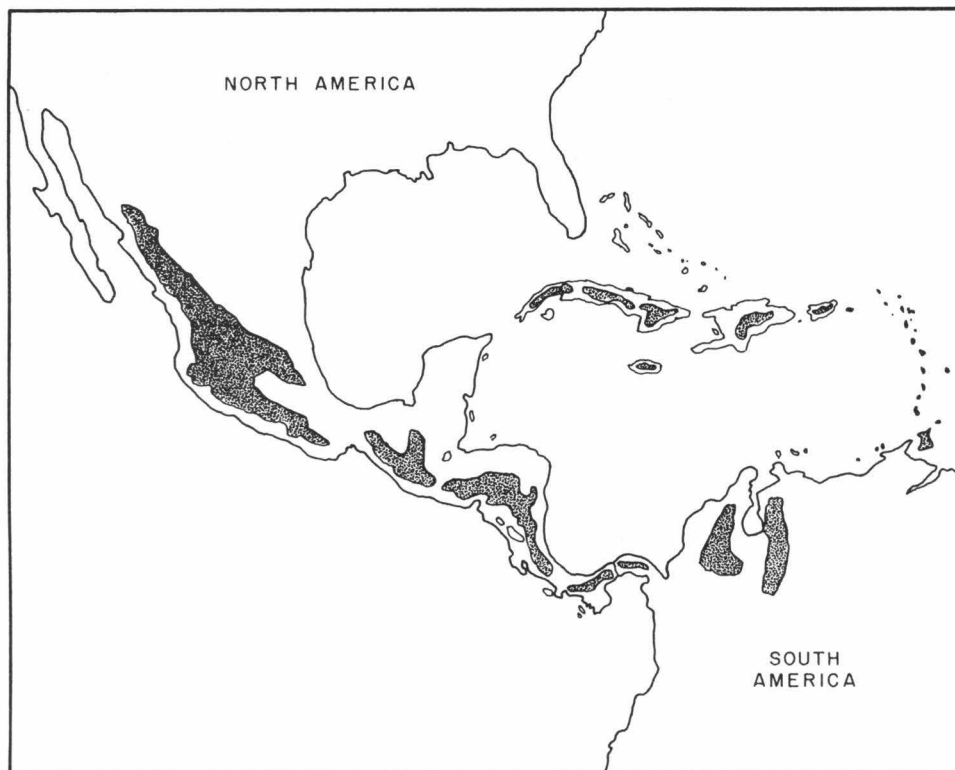


Figure 1.— A mature almendrón (*Prunus occidentalis* Sw.) growing at a 700-m elevation in the Dominican Republic.



**Figure 2.**— Shaded areas represent the native range of almendrón (*Prunus occidentalis* Sw.) in the Caribbean and Central and South America.

ridges, and slopes, mainly in the Central Cordillera and Sierra de Cayey, corresponding to the St. John Peneplain physiographic region of the island (3). The elevations range from 450 to 900 m. The species does not occur on coastal plains or in soils derived from limestone formations. Soils are loamy or clayey when derived from igneous, highly weathered, basic volcanic, and plutonic rocks. The soils are moderately permeable and well drained, with pH values that are strongly to moderately acid. Almendrón was planted in 1945 for an adaptability trial in the Luquillo Mountains at an elevation of 550 m (29) on the southeast side near Naguabo. The site has slopes of 40 percent and soils derived from granitic rock. Soils were acid and of loamy and loamy-clay texture (33). In the Dominican Republic, almendrón grows in the Central Cordillera in the vicinity of Jarabacoa and Constanza at elevations ranging from 600 to 1,095 m on sideslopes, ridges, upland valleys, and in sandy loamy soils near streams and rivers (author, personal observation). A study (9) describes almendrón as a primary species and an element of the secondary growth in the humid valleys of the "foresta udomesofítica" (ecotone between moist and wet subtropical forests). This area has neutral soils with an elevation of about 300 m.

In Cuba, almendrón has been reported in moist areas from different geological origins. On the southwestern coast of the Sierra Maestra, the species was reported as a component of the forest from sea level to a 520-m elevation. In the same region, almendrón was found among the most abundant species in the north slope forest. The elevation in this area ranges from 500 to 1,000 m, with soils derived from granitic diorite and related rocks. Almendrón is also found on the south slope from elevations of 500 to 900 m, on allu-

vial soils derived from igneous rock usually in deep valleys, bottom valleys, and areas adjacent to lower slopes. In the Cabo Cruz forest cover in the Sierra Maestra region, the species is found in areas with surface layers derived from limestone deposits. Almendrón has been reported in the eastern Oriente Province in valleys and highlands of igneous origin, such as the Sierra Nipe and Sierra Cristal, and also to the north and east of the San Luis-Guantánamo Valley, at a 150- to 550-m elevation. The species has been reported in soils derived from limestone on the southern coast between Guantánamo and Cape Maisí in areas from the mangrove swamps to an elevation of 460 m. Almendrón has been listed among the species of the upland limestone areas in the Sierra del Rosario in valleys of alluvial soils and along streams. In the forests of the Trinidad Mountain region, almendrón was reported on the lower slopes in areas formed of limestone at a 300-m elevation up to areas at a 920-m elevation that are formed of igneous and metamorphic rock (32).

In Jamaica, the species has been reported in the John Crow Mountains on the northeast side of the island at about a 450-m elevation. This area is formed of hard, massive white limestone of the Eocene age (24). Almendrón trees have been observed in the central limestone valleys in the southwest Colonels Ridge area at about a 600-m elevation.<sup>1</sup>

<sup>1</sup> Proctor, George R. 1994. Personal communication with the author. On file at: the International Institute of Tropical Forestry, U.S. Department of Agriculture, Forest Service, Río Piedras, PR 00928-2500.

## Associated Forest Cover

Almendrón probably was an important component of the pristine forests of Puerto Rico, but today, although not common, it primarily inhabits early and advanced secondary forests of the Central Cordillera. The species is an element of the active and abandoned shade coffee forest of the central humid mountains. It occurs in association with *Alchornea latifolia* Sw., *Andira inermis* (W. Wright) H.B.K., *Cecropia schreberiana* Miq., *Cedrela odorata* L., *Citrus aurantium* L., *C. sinensis* Osbeck, *Coffea arabica* L., *Dendropanax arboreus* (L.) Decne. & Planch., *Erythrina poeppigiana* (Walp.) O.F. Cook, *Ficus citrifolia* Mill., *Guarea guidonia* (L.) Sleumer, *Inga fagifolia* (L.) Willd., *I. vera* Willd., *Juglans jamaicensis* C. DC., *Ocotea leucoxylon* (Sw.) Mez, *Pouteria multiflora* (A. DC.), *Schefflera morototoni* (Aubl.) Decne. & Planch., *Sideroxylon portoricense* Urban, and *Tetragastris balsamifera* (Sw.) Kuntze (author, personal observation).

Two existing plantations established in the Luquillo Experimental Forest (LEF) showed almendrón grew well in the tabonuco forest zone (author, personal observation) with species such as *Cecropia schreberiana*, *Cordia borinquensis* Urban, *Cyathea arborea* (L.) J.E. Smith, *Dacryodes excelsa* Vahl, *Guarea guidonia*, *O. moschata* (Meisn.) Mez, *O. portoricensis* Mez, *Prestoea montana* (R. Grah.) Nichols., *Sapium laurocerasus* Desf., *Schefflera morototoni*, and *Spathodea campanulata* Beauv. (29). In the mesophytic forest of the Dominican Republic (9), the species grew in association with *Capparis baducca* L., *Catalpa longissima* (Jacq.) Sims, *Cecropia schreberiana*, *Ceiba pentandra* (L.) Gaertn., *Chrysophyllum oliviforme* L., *Cordia alliodora* (R. & P.) Oken, *Clusia rosea* Jacq., *Cupania americana* L., *Drypetes alba* Poit., *Guarea guidonia*, *Swietenia mahagoni* Jacq., *Trichilia hirta* L., and *T. pallida* Sw. In a visit to the mountains and valleys of Constanza and Jarabacoa in the Dominican Republic, almendrón was found coexisting with the same species and in similar habitats as in Puerto Rico, but at higher altitudes. In Cuba, almendrón has been reported in coastal forest areas of limestone layers up to a 300-m elevation, with species such as *Andira inermis*, *Bucida buceras* L., *Calophyllum calaba* Jacq. non L., *Canella winterana* (L.) Gaertn., *Cordia nitida* Vahl, *Erythroxylon* sp., *Guaiacum officinale* L., *Lonchocarpus longipes* Urban, *Picramnia pentandra* Sw., *Prunus myrtifolia* (L.) Urban, *Roystonea regia* (H.B.K.) O.F. Cook, *Siberoxylum salicifolium* (L.) Lam., *Swietenia mahagoni*, *Tabebuia* sp., and *Trophis racemosa* (L.) Urban.

In highland forests on limestone-derived soils at elevations ranging from 300 to 500 m, almendrón has been reported growing with *Bursera simaruba* (L.) Sarg., *Cedrela odorata*, *Erythroxylon* sp., *Genipa americana* L., *Guazuma ulmifolia* Lam., *Hibiscus* sp., *Juglans jamaicensis*, *Licaria* sp., *O. coriacea* (Sw.) Britton, *Oxandra lanceolata* (Sw.) Baill., *Pithecellobium arboreum* (L.) Urban, *Prunus myrtifolia*, *Pseudolmedia spuria* (Sw.) Griseb., *Roystonea regia*, *Spondias mombin* L., *Trophis racemosa*, and *Zanthoxylum martinicense* (Lam.) (DC). In semideciduous and broadleaf forests, almendrón was found in soils derived from igneous and metamorphic rocks at elevations of 300 to 1,524 m. Almendrón grew with *Buchenavia tetraphylla* (Aublet) Howard, *Calyptranthes* sp., *Cecropia schreberiana*, *Coccoloba diversifolia* Jacq., *Cordia odorata*, *Cyrilla antillana*

Mich., *Exothea paniculata* (Juss.) Radlk., *Guatteria blainii* (Griseb.) Urban, *Juglans jamaicensis*, *Laplacea* sp., *Magnolia cubensis* Urban, *Ocotea floribunda* (Sw.) Mez, *O. leucoxylon*, *Pinus occidentalis* Sw., *Protium cubense* (Rose) Urban, *Prunus myrtifolia*, and *Sideroxylum salicifolium* (32). In Jamaica, the species was recorded among the woody plants, which were growing in the Hog Hill House area of the John Crow Mountains at a 425-m elevation (24). Some of the species listed included *Alchornea latifolia* Sw., *Andira inermis*, *Beilschmiedia pendula* (Sw.) Benth. & Hook. F., *Bunchosia jamaicensis* Urb. & Niedenzu, *Calophyllum calaba*, *Casearia sylvestris* Sw., *Cedrela odorata*, *Ceiba pentandra*, *Citharexylum caudatum* L., *Coccoloba swartzii* Meisn., *Dendropanax arboreus*, *Erythroxylum areolatum* L., *Hibiscus elatus* Sw., *Pisonia subcordata* Sw., *Prunus myrtifolia*, *Sapium jamaicense* Sw., and *Turpinia occidentalis* (Sw.) G. Don.

## LIFE HISTORY

### Reproduction and Early Growth

**Flowering and Fruiting.**—In Puerto Rico, almendrón blooms from December to February and bears fruit from February to March, although phenology can vary with location. Fruits were collected that had pulp in the process of natural degradation during March from the localities of Constanza and Jarabacoa, Dominican Republic (author, personal observation). In the Sierra del Rosario of Cuba, flowering occurs from October to December and sometimes extends to February. Fruiting proceeds from November to December but may be prolonged until June and July (34). Fruits in Cuba usually mature during April, May, and June (14). In Jamaica, flowering has been reported from January to April and fruiting from January to May (1). The flowers, which are bisexual (17), are fragrant, insect pollinated, and appear to be extremely abundant pollen producers. Flowers are racemes about 4.5 to 10 cm long, one to four per fascicle or branched from the base in an axillary position. The receptacle is pubescent with coarse, stiff hairs inside at the base of the pistil (19). The pistil has a one-celled ovary and a short style (25), with a peduncle 4 to 7 mm long. The hypanthium is narrow at the base and wide at the apex, with five lobed sepals; five white, rounded petals 2 to 3 mm long; and stamens in two whorls (19). The fruit is an oval to ellipsoid drupe with a soft, fleshy, light-yellow mesocarp. At maturation, the exocarp is a reddish-brown color, turning dark brown to almost black, and the endocarp is yellowish beige enclosing a single seed. The pericarp is 16 to 25 mm long and 12 to 14 mm thick (19). Fruit production is relatively good; a sample of drupes from a 40-year-old plantation in the LEF yielded 248 fruits per kilogram that averaged  $20.3 \pm 0.1$  mm (mean  $\pm$  standard error) in length and  $13.5 \pm 0.9$  mm in width (author, personal observation). In May 1945, a sample of fruits collected from the Guilarte Mountains yielded an average of 205 fruits per kilogram.<sup>2</sup>

<sup>2</sup>Figuerola, Julio C. 1979. Native species trials; FS-SO-1152 Study 2498 Problem 1. On file at: the International Institute of Tropical Forestry, U.S. Department of Agriculture, Forest Service, Río Piedras, PR 00928-2500.



**Seed Production and Dissemination.**—The seed is enclosed in a thick, juicy, reddish-brown pulp. When cut open, a delightful almond fragrance is quickly noticed. A sample of air-dried seeds collected in the Dominican Republic averaged  $1.9 \pm 0.035$  g per seed or 524 seeds per kilogram. A group of air-dried seeds from an LEF plantation averaged  $1.4 \pm 0.037$  g per seed or 702 seeds per kilogram (author, personal observation). Foresters in Cuba (14) reported an average of 518 seeds per kilogram. In Puerto Rico, seeds and mature and freshly fallen fruits are available from May to August and can be easily collected from the ground below parent trees where rotting removes the rind (author, personal observation). Seed dispersal is done primarily by bats and by birds of the families Psittacidae and Columbidae, such as parrots of the genus *Amazona* and pigeons of the genus *Columba* (15), respectively. These animals consume the fleshy pulp of the fruit. Water also contributes to the dispersal process.

**Seedling Development.**—Germination in almendrón is epigeous; that is, the cotyledons are raised above the soil surface. A sample of seeds from the Dominican Republic in a mix of peat moss, perlite, and vermiculite yielded 52-percent germination in 30 days (author, personal observation). Seeds with the pulp removed sowed in a substratum of a 50-50 mix of sand and peat moss start germinating in 7 days and give an 80-percent germination rate in 14 days, whereas seeds with pulp intact begin germinating in 13 days.<sup>3</sup> In Cuba, foresters have reported 30-percent germination in 15 days, 47-percent in 20 days, 52-percent in 25 days, and 56-percent in 30 days; the seedlings reached a height of 63 cm the first year (14). Development of seedlings in our nursery in Puerto Rico was rapid and thrifty with low mortality. Seedling leaves were brilliant green and shaped like adult leaves. A sample of 115 seedlings reached a mean height of  $36.39 \pm 0.98$  cm and maximum height of 63 cm in 1 year. The mean basal diameter was  $0.51 \pm 0.01$  mm, with a maximum of 0.73 mm (author, personal observation). After 2 years, a trial of 50 seedlings planted in full sun in clayey soil, with an acid pH at a 525-m elevation and 3040 mm of mean annual precipitation, resulted in 90-percent survival. Seventy-six percent of the saplings were thrifty and healthy, with a mean height of  $73.5 \pm 3.69$  cm and a maximum height of 1.24 m. Mean basal diameter was  $0.97 \pm 0.04$  cm, and maximum basal diameter was 1.80 cm. After 18 months, three trees planted in full sun in a karst area showed green healthy leaves and averaged 1.48 m in height and a root collar diameter of 1.6 cm.

Natural regeneration occurs abundantly under the parent stands, although the vast majority of the seedlings die in a few months. In a study in Cuba, relatively good natural regeneration was reported, although survival was low, with a mean height of  $16.5 \pm 1.1$  cm (15). Almendrón seedlings do not tolerate bare-root propagation. The mortality rate was 100 percent when 1,000 bare-root wildlings were

removed from the parent understory and transplanted to individual nursery bags (author, personal observation). Nursery-raised seedlings should be outplanted when they are 36 to 46 cm tall and have stem diameters between 0.42 and 0.62 cm. Under normal conditions, these heights can be attained in 6 to 8 months. Because germination is fast, seedling development is good, and pests and predators are not limiting factors. Direct seeding could probably be another method for planting.

**Vegetative Reproduction.**—No information is available on almendrón's rooting, grafting, or coppicing capacities. Sprouts from stumps have been reported in *Prunus serotina* Ehrh. (black cherry), which grows rapidly in full sunlight (26).

*Prunus pensylvanica* L. F. (pin cherry) produces root shoots easily and has been used as grafting and building stock for *P. cerasus* L. (sour cherry) (35). Two years after Hurricane Hugo, sprouting was observed in almendrón trees that had been blown over. Grafting and budding have been used to improve commercial varieties (20) of *P. persica* Batsch. (peach).

### Sapling and Pole Stage to Maturity

**Growth and Yield.**—Almendrón is a large native tree with the potential of becoming an important timber species. In Puerto Rico, an imposing tree with large buttresses, 184 cm in d.b.h., and 48 m in height can be seen along road PR 149, from Ciales to Villalba, near km 35.5 (author, personal observation). In Puerto Rico's subtropical wet forest life zone in the Luquillo Mountains, almendrón seedlings were planted in various sites. One of these sites was established in 1945 over stony acid soil derived from granitic rock, with slopes averaging 40 percent at 500 m and a tree composition of 13 species (table 1). This 0.1-ha site showed an annual d.b.h. increment for almendrón of 0.76 cm/yr and an average height of 25 m (29). Another site was established in 1953 and covers 0.4 ha in a ravine at an elevation of 500 m in soil similar in composition to the former site. This plantation at 3 years had a height growth of 2.1 to 2.4 m; at 10 years, the trees averaged 10.7 m in height;<sup>4</sup> and at 40 years, the mean height was  $27.9 \pm 1.1$  m with an annual d.b.h. increment of 0.79 cm and a mean d.b.h. of  $31.7 \pm 1.2$  cm. Clear bole height averaged 10.9 m, and the estimated standing volume was 71.5 m<sup>3</sup>, which would be 176 m<sup>3</sup>/ha (author, personal observation). Volume was computed using clear bole height and basal area for each tree. Volume and d.b.h. class distribution are shown in figure 3. The d.b.h. classes 32 to 41 cm and 41 to 50 cm have the highest volume and number of trees.

In 1989, Hurricane Hugo killed 11 almendrón trees on the 0.4-ha site; they were either thrown or snapped. Basal area and estimated volume of these trees were 0.79 m<sup>2</sup> and

<sup>3</sup>Cotto, Julio. 1994. Personal communication with the author. On file at: the International Institute of Tropical Forestry, U.S. Department of Agriculture, Forest Service, Río Piedras, PR 00928-2500.

<sup>4</sup>Marrero, José. 1963. *Prunus occidentalis*, Study 1910. On file at: the International Institute of Tropical Forestry, U.S. Department of Agriculture, Forest Service, Río Piedras, PR 00928-2500.

**Table 1.**—Relative density, relative basal area, relative frequency, and importance value in a 38-year-old almendrón (*Prunus occidentalis* Sw.) plantation (0.1 ha) in the Luquillo Experiment Forest having 450 trees per hectare and a total basal area of 26 m<sup>2</sup>/ha (31)

Species*	Relative density	Relative basal area	Relative frequency	Importance value
----- Percent -----				
<i>Prunus occidentalis</i> (Sw.)	36.0	38.0	16.0	90.0
<i>Guarea guidonia</i> (L.) Sleumer	16.0	15.0	16.0	47.0
<i>Prestoea montana</i> (R. Grah.)	11.0	4.0	12.0	27.0
<i>Cecropia schreberiana</i> Miq.	9.0	6.0	8.0	23.0
<i>Dendropanax arboreus</i> (L.) Decne. & Planch.	2.0	16.0	4.0	22.0
<i>Ocotea leucoxydon</i> (Sw.) Mez	4.0	2.0	8.0	14.0
<i>Spathodea campanulata</i> Beauv.	4.0	2.0	8.0	14.0
<i>Pouteria multiflora</i> (A.DC.) Eyma	4.0	6.0	4.0	14.0
<i>Inga vera</i> Willd.	2.0	8.0	4.0	14.0
<i>Cyathea arborea</i> (L.) J.E. Smith	4.0	1.0	8.0	13.0
<i>Andira inermis</i> (W. Wright) H.B.K.	2.0	1.0	4.0	7.0
<i>Ocotea portoricensis</i> Mez	2.0	1.0	4.0	7.0
<i>Schefflera morototoni</i> (Aubl.) Decne. & Planch.	2.0	0.4	4.0	6.4

\*Species are listed according to importance value.

6.5 m<sup>3</sup>, respectively. In a report on a 10-year-old plantation in the central mountains (Guilarte State Forest) of Puerto Rico, the best trees on stony soil were 13.7 to 15.2 m tall.<sup>5</sup> In the Dominican Republic, eight trees of unknown age located by the author in the vicinity of Jarabacoa and Constanza averaged 46.7 cm in d.b.h with a range of 22.1 to 115 cm. The heights averaged 25.1 m with a range of 16.6 to 48 m.

**Rooting Habit.**—Seedlings develop a fibrous taproot, which grows rapidly with many fine lateral roots. Because of the rapid taproot growth, a deep nursery bed should be used to prevent damage to the root (author, personal observation). A study in Cuba reported a vesicular-arbuscular endomycorrhizae root symbiosis for almendrón; the level of infection reported for seedlings was 26.9 percent with no lateral hairs (13). Large trees observed by the author have large exposed lateral roots and buttresses.

**Reaction to Competition.**—In Cuba, almendrón has been described as an emergent tree. It is shade intolerant and has relatively low seedling survival in natural stands. Mainly because of the succulent oily leaves and growing apex, the wildlings are subject to a high incidence of herbivorous consumption. The survival rate is also low because seedlings have a relatively low cotyledon reserve, and they have an intrinsically low capacity to resist long droughts (16). In a 40-year-old stand in the LEF, natural regeneration has been abundant under the stand and in the surrounding area, but most seedlings soon died. Under natural conditions, relatively few individuals reach sapling size or larger. However, some of the survivors will eventually

penetrate the canopy. In the 0.4-ha stand (for trees with a d.b.h. > 5.99 cm), most ingrowths were suppressed and intermediate in the vertical stratification and were components of the 6- to 14-cm d.b.h. class, which represented 6 percent of the standing trees (fig. 3). Almendrón grows well in plantations. The two sites in the LEF supported total basal areas of 26 m<sup>2</sup>/ha (28) and 25.6 m<sup>2</sup>/ha, respectively; the 0.4-ha site had a basal area for almendrón of 5.81 m<sup>2</sup> (14.35 m<sup>2</sup>/ha). In this 40-year-old stand, crowns were crowded, forming a dense canopy among dominant and codominant trees. The average crown ratio (crown diameter: d.b.h.) was 30:1. Trees were self-pruned, and clear boles were mostly straight. They averaged 10.9 m in height and lacked epicormic branches.

**Damaging Agents.**—In Cuba, almendrón trees showed a high incidence of herbivorous depredation on the growing apexes of seedlings (16). In the LEF stands, the author observed damaged leaves on most adult trees that appeared to be caused by weevil (Coleoptera) feeding injuries; however, trees seemed healthy. Defoliation caused by a fungus, *Rhytisma leptospilum* Berk et Curt, was observed in a 10-year-old stand at a high elevation. This fungus has been observed infecting seedlings, twigs, and stems in nurseries at higher elevations (37). In a banana plantation at a 450-m elevation, the author observed saplings of almendrón partially defoliated; the remaining leaves showed a powdery mildew. Leaves examined in the lab showed an imperfect state of *Phyllactinia guttata* (Wallr. ex Fr.) Lév., known as *Ovulariopsis* Pat. and Har., growing on these leaves.<sup>6</sup> In Puerto Rico, the weevil *Compsus maricao* Wolcott has caused

<sup>5</sup>Marrero, José. 1955. *Prunus occidentalis*, Study 1333 GL. On file at: the International Institute of Tropical Forestry, U.S. Department of Agriculture, Forest Service, Río Piedras, PR 00928-2500.

<sup>6</sup>Almodóvar, Wanda I. 1995. Personal communication with the author. On file at: the International Institute of Tropical Forestry, U.S. Department of Agriculture, Forest Service, Río Piedras, PR 00928-2500.

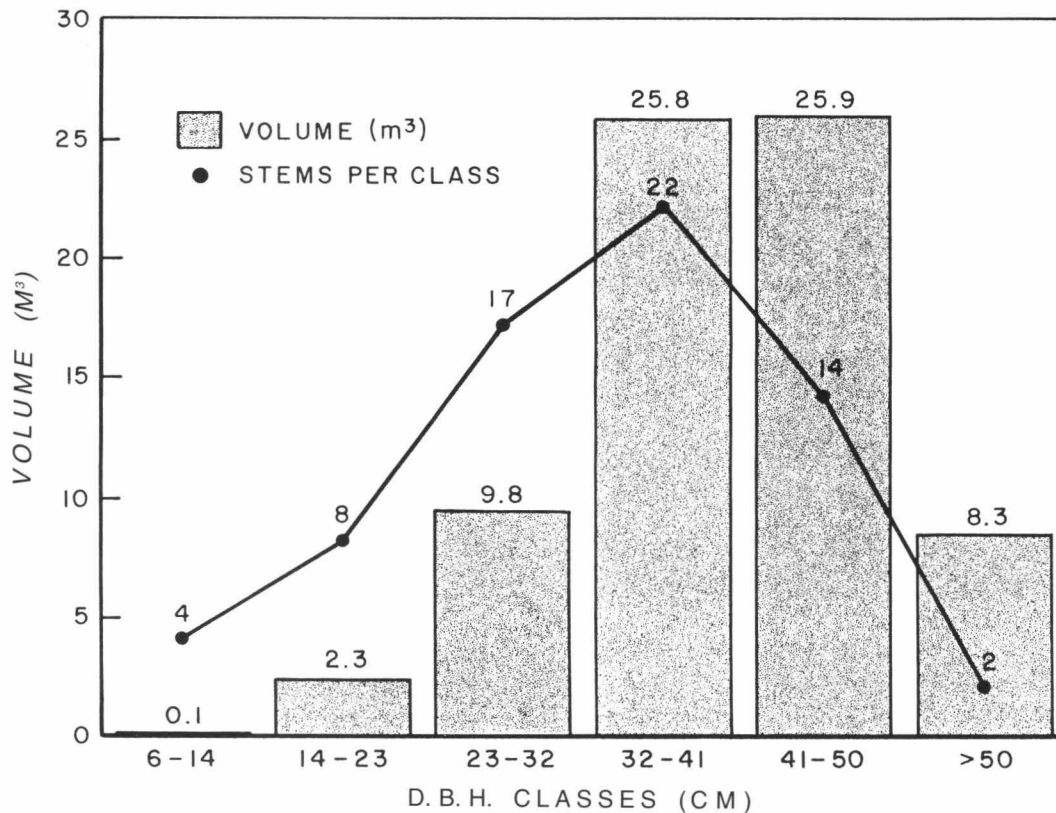


Figure 3.— Volume and diameter class distribution of almendrón (*Prunus occidentalis* Sw.) in a 40-year-old plantation in the Luquillo Experimental Forest.

defoliation on nursery seedlings. Another weevil, *Diaprepes abbreviatus* L., has heavily attacked unshaded trees. A common insect, *Pseudalacaspis pentagona* (Targioni), the white scale usually found in papaya, has heavily infested several nursery trees. During winter, aphids such as *Myzas persicae* (Sulczer) are found in much greater abundance but do not cause curling of the leaves. *Aphis spiraeicola* Patchhave, however, has been reported infesting almendrón's tender leaves regardless of the season (37).

Several organisms are involved in the consumption and decomposition of almendrón's fruit pulp. Under the parent stand in the LEF, fruits were observed that showed teeth marks of either bats or rats on the fruit pulp, although there was no damage to the seed. The author observed seeds with holes bored in the endocarp by an unknown insect, and some seeds were infested by maggot-type larvae. In Puerto Rico, collected fruits have been reported as heavily infested with maggots of the fruit fly *Anastrepha suspensa* Loew (37).

## SPECIAL USES

Almendrón's main economic importance is its wood, which is more resistant to the dry-wood termite *Cryptotermes*

*brevis* Walker than West Indian mahogany, *Swietenia mahagoni* Jac. (30). In Cuba, almendrón, with a density of 0.86 g/cm<sup>3</sup> (ovendried), is considered one of the best forest species for the quality of its wood and bole (4, 14). The wood has been described as having a rich, dark, reddish-brown heartwood, usually somewhat variegated, with a flesh-colored sapwood. Almendrón's texture is medium to coarse, showing a lustrous natural polish after being worked. Tough and strong, it has an air-dried specific gravity ranging from 0.90 to 1.05 g/cm<sup>3</sup> (25, 30). Five samples of wood collected by the author from a local sawmill ranged in specific gravity (ovendried) from 0.72 to 0.82 g/cm<sup>3</sup> and averaged 0.78 g/cm<sup>3</sup>. The wood has many of the same properties and uses as the black cherry *Prunus serotina* Ehrh., a beautiful and valuable wood for cabinet making and furniture (20). Almendrón has been used for house flooring because of its fine, lustrous finish, although it is not recommended for outdoor use (30). It is also used for posts and poles, railway crossties, construction, implement frames, and roof beams.

Aliqueur, the noyau of Martinique, is made from the kernels of the drupe of this West Indian tree (30). It has a superior flavor to that of the peach. It has a rich, oily, and nutty taste combined with the flavor of prussic acid.

Almendrón is also known for its medicinal properties. In Cuba and Mexico, the bark, leaves, and fruits have been

used in infusions to treat asthma and in preparations used to reduce cardiovascular pressure. An expectorant and cough syrup have been prepared from its seeds (23, 28).

## GENETICS

The Rose family can be divided into two groups (I, II), five subfamilies, and numerous tribes. Subfamilies of group I have a basic chromosome number of 7, 8, or 9. The *Prunus* genus of the Prunoideae subfamily (group I) has one carpel and a drupe fruit (17). The New World has about 100 species of the genus *Prunus* ranging from the temperate to the tropical and subtropical areas (30). Almendrán is unique in the Caribbean Basin. Botanical synonyms are *Cerasus occidentalis* Loisel. and *Laurocerasus occidentalis* (Sw.) Roe (19, 21).

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